CLAIMS

1. A solid state image sensor comprising:

a plurality of photo-conductive units which are arranged in each direction of the row and the column in the two-dimensional shape and which obtain a signal electric-charge by receiving light;

a column electric-charge transfer unit which transfers said signal electric-charge obtained by said photo-conductive unit in the direction of said column; and

an electric-charge detection unit which is provided for every plurality of said adjacent columns and which converts said signal electric-charge transferred by said column electric-charge transfer unit into a pixel signal; wherein

with respect to said plurality of adjacent columns, when said signal electric-charge obtained by said photo-conductive unit at the same position in the direction of said row reaches said electric-charge detection unit, a phase of the electric-charge transfer is made different.

2. A solid state image sensor comprising:

a plurality of photo conductive units which are arranged in each direction of the row and the column in the two-dimensional shape and which obtain a signal electric-charge by receiving light;

a column electric-charge transfer unit which transfers said signal electric-charge obtained by said photo conductive

unit in the direction of said column;

an electric-charge detection unit which is provided for every plurality of said adjacent columns and which converts said signal electric-charge transferred by said column electric-charge transfer unit into a pixel signal; and

a dummy electric-charge transfer unit arranged between said column electric-charge transfer unit and said electric-charge detection unit, in which the number of stages of electric-charge transfer is different with respect to each of said plurality of columns.

3. The solid state image sensor according to claim 2, wherein

in the electric-charge transfer units of said plurality of adjacent columns, an electrode used for the vertical transfer drive is used in common.

4. The solid state image sensor according to claim 2, wherein

said electric-charge detection unit is provided for every two said adjacent columns.

5. The solid state image sensor according to claim 4, wherein

in said dummy electric-charge transfer unit, the number of stages of said electric-charge transfer is different to the extent that a phase of the electric-charge transfer becomes 180 degrees inverted between said two adjacent columns, when said

signal electric-charge at the same position in the direction of said row is made to reach said electric-charge detection unit.

6. A solid state image sensor comprising:

a plurality of photo conductive units which are arranged in each direction of the row and the column in the two-dimensional shape and which obtain a signal electric-charge by receiving light;

a column electric-charge transfer unit which transfers said signal electric-charge obtained by said photo conductive unit in the direction of said column; and

an electric-charge detection unit provided for every plurality of said adjacent columns and which converts said signal electric-charge transferred by said column electric-charge transfer unit into a pixel signal, wherein

an electrode used for driving a vertical transfer is formed such that a phase of electric-charge transfer when said signal electric-charge obtained by said photo-conductive unit at the same position in the direction of said row reaches said electric-charge detection unit is different, when a common vertical transfer control signal is applied to said plurality of adjacent columns.

7. The solid state image sensor according to claim 1, wherein

said electric-charge detection unit includes a selective gate, which is shared with said plurality of adjacent columns,

for reading out said signal electric-charge on the input side of said signal electric-charge.

8. The solid state image sensor according to claim 2, wherein

said electric-charge detection unit includes a selective gate, which is shared with said plurality of adjacent columns, for reading out said signal electric-charge on the input side of said signal electric-charge.

9. The solid state image sensor according to claim 6, wherein

said electric-charge detection unit includes a selective gate, which is shared with said plurality of adjacent columns, for reading out said signal electric-charge on the input side of said signal electric-charge.

10. The solid state image sensor according to claim 1, wherein

a wiring to said selective gate is shared with the wiring to said selective gate with respect to said electric-charge detection units of adjacent others.

11. The solid state image sensor according to claim 2, wherein

a wiring of said selective gate is shared with the wiring to said selective gate with respect to said electric-charge detection units of adjacent others.

12. The solid state image sensor according to claim 6,

wherein

a wiring of said selective gate is shared with the wiring to said selective gate with respect to said electric-charge detection units of adjacent others.

13. A solid state image sensor comprising:

a plurality of photo-conductive units which are arranged in each direction of the row and the column in the two-dimensional shape and which obtain a signal electric-charge by receiving light;

a column electric-charge transfer unit which transfers said signal electric-charge obtained by said photo-conductive unit in the direction of said column; and

an electric-charge detection unit which is provided for every two of said columns and which converts said signal electric-charges transferred by said column electric-charge transfer unit into a pixel signal, wherein

said electric-charge detection unit includes a selective gate which is provided independently for each of said two adjacent columns for reading out said signal electric-charge on the input side of said signal electric-charge.

14. The solid state image sensor according to claim 1, wherein

each of said electric-charge detection units includes a reset gate in said electric-charge detection unit to be initialized after said signal electric-charge is converted into

said pixel signal.

15. The solid state image sensor according to claim 2, wherein

each of said electric-charge detection units includes a reset gate in said electric-charge detection unit to be initialized after said signal electric-charge is converted into said pixel signal.

16. The solid state image sensor according to claim 6, wherein

each of said electric-charge detection units includes a reset gate in said electric-charge detection unit to be initialized after said signal electric-charge is converted into said pixel signal.

17. The solid state image sensor according to claim 13, wherein

each of said electric-charge detection units includes a reset gate in said electric-charge detection unit to be initialized after said signal electric-charge is converted into said pixel signal.

18. The solid state image sensor according to claim 1, wherein

a differential detection unit which detects the difference between the output without said signal electric-charge and the signal level with said signal electric-charge, of said pixel signal, is provided subsequently to said electric-charge

detection unit.

19. The solid state image sensor according to claim 2, wherein

a differential detection unit which detects the difference between the output without said signal electric-charge and the signal level with said signal electric-charge, of said pixel signal, is provided subsequently to said electric-charge detection unit.

20. The solid state image sensor according to claim 6, wherein

a differential detection unit which detects the difference between the output without said signal electric-charge and the signal level with said signal electric-charge, of said pixel signal, is provided subsequently to said electric-charge detection unit.

21. The solid state image sensor according to claim 13, wherein

a differential detection unit which detects the difference between the output without said signal electric-charge and the signal level with said signal electric-charge, of said pixel signal, is provided subsequently to said electric-charge detection unit.

22. The solid state image sensor according to claim 1, further comprising:

a plurality of said electric-charge detection units with

respect to said plurality of adjacent columns in the direction of said column with said plurality of columns as a group, and

a horizontal scanning unit subsequent to said plurality of electric-charge detection units, which sequentially selects and outputs said pixel signal that is output from each of said plurality of electric-charge detection units in time series in the direction of said row.

23. The solid state image sensor according to claim 2 further comprising:

a plurality of said electric-charge detection units with respect to said plurality of adjacent columns in the direction of said column with said plurality of columns as a group, and

a horizontal scanning unit subsequent to said plurality of electric-charge detection units, which sequentially selects and outputs said pixel signal that is output from each of said plurality of electric-charge detection units in time series in the direction of said row.

24. The solid state image sensor according to claim 6 further comprising:

a plurality of said electric-charge detection units with respect to said plurality of adjacent columns in the direction of said column with said plurality of columns as a group, and

a horizontal scanning unit subsequent to said plurality of electric-charge detection units, which sequentially selects and outputs said pixel signal that is output from each of said

plurality of electric-charge detection units in time series in the direction of said row.

25. The solid state image sensor according to claim 13 further comprising:

a plurality of said electric-charge detection units with respect to said plurality of adjacent columns in the direction of said column with said plurality of columns as a group, and

a horizontal scanning unit subsequent to said plurality of electric-charge detection units, which sequentially selects and outputs said pixel signal that is output from each of said plurality of electric-charge detection units in time series in the direction of said row.

26. A drive method of a solid state image sensor, in which a pixel signal is obtained from a solid state image sensor that includes a column electric-charge transfer unit which transfers signal electric-charge obtained by photo-conductive units arranged in each direction of the row and the column in the two-dimensional shape in the direction of said column, and

an electric-charge detection unit which is provided for every plurality of said adjacent columns and which converts said signal electric-charge transferred by said column electric-charge transfer unit in the direction of said column into a pixel signal, wherein

said solid state image sensor is driven such that said pixel signal with respect to each of said plurality of said

adjacent columns is output with a different phase when said signal electric-charge is transferred in the direction of said columns.

27. The drive method according to claim 26, wherein

said column electric-charge transfer unit is driven by six-phase drive.

28. The drive method according to claim 26, wherein

said electric-charge detection unit includes on the input side of said signal electric-charge

a selective gate for reading out said signal electric-charge, and

a reset gate for initializing after said signal electric-charge is converted into said pixel signal, and

said reset gate is made to turn on when said selective gate is off.

29. An image pick-up method to obtain an image signal using a solid state image sensor that includes a column electric-charge transfer unit which transfers the signal electric-charge obtained by the photo-conductive units arranged in each direction of the row and the column in the two-dimensional shape in the direction of said column, and

an electric-charge detection unit which is provided for every plurality of said adjacent columns and which converts said signal electric-charge transferred by said column electric-charge transfer unit in the direction of said column into a

pixel signal, wherein

said pixel signal with respect to each of said plurality of said adjacent columns is obtained having a different phase in the transfer of said signal electric-charge in the direction of said columns;

the obtained pixel signal is sequentially selected in time series in the direction of said row, so that the image signal with respect to each of said different phases is obtained; and

after that, the image signal sequentially aligned in the direction of said row is obtained by rearranging said pixel signals of said image signal in the direction of said row in accordance with the order of said plurality of columns.

30. The drive method according to claim 29, wherein

said column electric-charge transfer unit is driven by six-phase drive.

31. An image pick-up device comprising:

a solid state image sensor, including:

a plurality of photo-conductive units which are arranged in each direction of the row and the column in the two-dimensional shape and which obtain a signal electric-charge by receiving light,

a column electric-charge transfer unit which transfers said signal electric-charge obtained by said photo-conductive unit in the direction of said column,

an electric-charge detection unit which is provided for

every plurality of said columns and which converts said signal electric-charge transferred by said column electric-charge transfer unit into a pixel signal, and

a dummy electric-charge transfer unit arranged between said column electric-charge transfer unit and said electric-charge detection unit, in which the number of stages of electric-charge transfer is different with respect to each of said plurality of columns;

a horizontal scanning unit which obtains an image signal with respect to each of said different phases by sequentially selecting in time series in the direction of said row said pixel signals that are output from said solid state image sensor with the different phases in the transfer in the direction of said columns of said signal electric-charges; and

a row adjustment unit which obtains the image signal sequentially aligned in the direction of said row by rearranging said pixel signals of the image signal that are output from said horizontal scanning unit in the direction of said row in accordance with the order of said plurality of columns.